

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

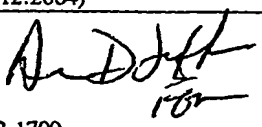
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 23 DEC 2004

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Applicant's or agent's file reference P2003J031-WO	<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416																
International application No. PCT/US04/10220	International filing date (day/month/year) 02 April 2004 (02.04.2004)	Priority date (day/month/year) 11 April 2003 (11.04.2003)																	
International Patent Classification (IPC) or national classification and IPC IPC(7): C10G 35/095; C07C 5/22, 5/23, 5/25, 5/27, 5/29, 5/31 and US Cl.: 208/135, 138; 585/666, 671, 739, 481																			
Applicant EXXONMOBIL RESEARCH AND ENGINEERING COMPANY																			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>6</u> sheets, as follows:</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of _____ (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <table style="margin-left: 20px; border: none;"> <tr> <td><input checked="" type="checkbox"/> Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/> Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/> Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/> Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/> Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/> Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/> Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/> Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>				<input checked="" type="checkbox"/> Box No. I	Basis of the report	<input type="checkbox"/> Box No. II	Priority	<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/> Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/> Box No. VI	Certain documents cited	<input type="checkbox"/> Box No. VII	Certain defects in the international application	<input type="checkbox"/> Box No. VIII	Certain observations on the international application
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Date of submission of the demand 01 October 2004 (01.10.2004)		Date of completion of this report 02 December 2004 (02.12.2004)																	
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer Walter D. Griffin  Telephone No. 571-272-1700																	

Form PCT/IPEA/409 (cover sheet)(January 2004)

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No. \_\_\_\_\_

PCT/US04/10220

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
    - ☐ international search (under Rules 12.3 and 23.1(b))
    - ☐ publication of the international application (under Rule 12.4)
    - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
  - ☐ the international application as originally filed/furnished
  - ☒ the description:
    - pages 1-18 as originally filed/furnished
    - pages\* NONE received by this Authority on \_\_\_\_\_
    - pages\* NONE received by this Authority on \_\_\_\_\_
  - ☒ the claims:
    - pages NONE as originally filed/furnished
    - pages\* NONE as amended (together with any statement) under Article 19
    - pages\* 19-24 received by this Authority on 01 October 2004 (01.10.2004)
    - pages\* NONE received by this Authority on \_\_\_\_\_
  - ☐ the drawings:
    - pages NONE as originally filed/furnished
    - pages\* NONE received by this Authority on \_\_\_\_\_
    - pages\* NONE received by this Authority on \_\_\_\_\_
  - ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☒ The amendments have resulted in the cancellation of:
  - ☐ the description, pages \_\_\_\_\_
  - ☒ the claims, Nos 24-27
  - ☐ the drawings, sheets/figs \_\_\_\_\_
  - ☐ the sequence listing (*specify*): \_\_\_\_\_
  - ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - ☐ the description, pages \_\_\_\_\_
  - ☐ the claims, Nos \_\_\_\_\_
  - ☐ the drawings, sheets/figs \_\_\_\_\_
  - ☐ the sequence listing (*specify*): \_\_\_\_\_
  - ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
PCT/US04/10220

## Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)

Claims 1-23 YES

Claims NONE NO

Inventive Step (IS)

Claims 1-23 YES

Claims NONE NO

Industrial Applicability (IA)

Claims 1-23 YES

Claims NONE NO

### 2. Citations and Explanations (Rule 70.7)

Claims 1-23 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a process to isomerize hydrocarbon feedstreams as claimed in which the catalyst is an aqueous treated catalyst resulting from subjecting the catalyst to an aqueous treatment conducted under conditions such that the aqueous-treated catalyst shows removal of sorbed ammonia at a temperature about 248°F (120°C) lower than the same untreated catalyst wherein the aqueous treatment comprises submersing the catalyst in water for less than about 24 hours at a temperature of about 210°F at about 575° (100° to about 300°C) and adjusting the pH of the water to about 2 to about 7 through the addition of an acidic or basic material that does not have a deleterious effect on said aqueous-treated catalyst.

Claims 1-23 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

International application No.  
PCT/US04/10220

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

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1. A process to isomerize hydrocarbon feedstreams comprising:
  - a) contacting a hydrocarbon feedstream with a catalyst comprising ferrierite, or a zeolite isostructural to ferrierite, under hydroisomerization conditions including:
    - i) temperatures of about 400 to about 800°F(205°C to about 430°C); and
    - ii) pressures of about 400 to about 2000 psig(2860 to about 13890 kPa);

wherein said catalyst is an aqueous treated catalyst resulting from subjecting said catalyst to an aqueous treatment conducted under conditions such that the aqueous-treated catalyst shows removal of sorbed ammonia at a temperature about 248°F(120°C) lower than the same untreated catalyst and wherein said aqueous treatment comprises i) submersing said catalyst in water for less than about 24 hours at a temperature of about 210°F to about 575°F (100 to about 300°C); and ii) adjusting the pH of the water to about 2 to about 7 through the addition of an acidic or basic material that does not have a deleterious effect on said aqueous-treated catalyst.
2. The process according to claim 1 wherein said hydrocarbon feedstream is a C<sub>10+</sub> hydrocarbon feedstream boiling in the range of about 345°F to about 1050°F.

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3. The process according to claim 1 wherein said hydrocarbon feedstream is a C<sub>9</sub> hydrocarbon feedstream boiling below about 345°F.
4. The process according to claim 1 wherein said aqueous-treated catalyst further comprises about 0.05 to about 2.0 wt.%, based on the catalyst, of at least one Group VIII metal.
5. The process according to claim 4 wherein said Group VIII metal is a Group VIII noble metal.
6. The process according to claim 5 wherein said Group VIII metal is Pt.
7. The process according to claim 6 wherein said basic material is dilute aqueous ammonium hydroxide, and said acidic material is dilute hydrochloric acid.
8. The process according to claim 7 wherein the product selectivity of the hydroisomerization process improves by more than about 20%.
9. The process according to claim 7 wherein the product selectivity of the hydroisomerization process improves by more than about 30%.

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10. The process according to claim 8 wherein the product selectivity of the hydroisomerization process improves by more than about 50%.
11. The process according to claim 6 wherein said aqueous-treated catalyst is treated after the addition of the metals.
12. The process according to claim 11 wherein said aqueous-treated catalyst further comprises at least one binder or matrix material selected from clays, silica, and alumina.
13. The process according to claim 12 wherein said binder or matrix material is alumina present in a ratio of less than about 15 parts zeolite to one part binder.
14. The process according to claim 7 wherein said water treatment does not result in the dealumination of said ferrierite.

15. A process to isomerize hydrocarbon feedstreams comprising:
- a) contacting a hydrocarbon feedstream with a catalyst comprising ferrierite, or a zeolite isostructural to ferrierite, and about 0.05 to about 2.0wt.% of at least one Group VIII metal, based on the weight of the catalyst, under hydroisomerization conditions including:
    - i) temperatures of about 400 to about 800°F(205°C to about 430°C); and
    - ii) pressures of about 400 to about 2000 psig(2860 to about 13890 kPa);

wherein said catalyst is an aqueous treated catalyst resulting from subjecting said catalyst to an aqueous treatment conducted under conditions such that the aqueous-treated catalysts show removal of sorbed ammonia at a temperature about 194°F to about 230°F(90 to about 110°C) lower than the same untreated catalyst, and wherein said aqueous treatment comprises i) submersing said catalyst in water for less than about 24 hours at a temperature of about 210°F to about 575°F (100 to about 300°C); and ii) adjusting the pH of the water to about 2 to about 7 through the addition of an acidic or basic material that does not have a deleterious effect on said aqueous-treated catalyst.



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16. The process according to claim 15 wherein said hydrocarbon feedstream is a C<sub>10+</sub> hydrocarbon feedstream boiling in the range of about 345°F to about 1050°F.
17. The process according to claim 15 wherein said hydrocarbon feedstream is a C<sub>9</sub> hydrocarbon feedstream boiling below about 345°F.
18. The process according to claim 15 wherein said Group VIII metal is a Group VIII noble metal.
19. The process according to claim 18 wherein said Group VIII metal is Pt.
20. The process according to claim 19 wherein said aqueous-treated catalyst is subjected to an aqueous treatment comprising submersing said aqueous-treated catalyst in water for less than about 20 hours at a temperature of 284°F to about 500°F (140 to about 260°C).
21. The process according to claim 19 wherein said aqueous-treated catalyst further comprises at least one binder or matrix material selected from clays, silica, and alumina.

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22. The process according to claim 21 wherein said aqueous treatment does not result in the dealumination of said ferrierite.

23. The process according to claim 22 wherein the product selectivity of the hydroisomerization process improves by more than about 20%.